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First record of *Ophrydium versatile* (Müller, 1786) Ehrenberg, 1838 (Protista: Peritrichida: Ophrydiidae) from the High Paraná River influence area (Misiones province, Argentina)

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Abstract: *Ophrydium versatile*, a green protozoon that form sessile colonies is reported for the first time for the Misiones province, Argentina from shallow waters of a recently formed pond in the Garupá stream floodplain, at about 900 m away from the confluence with the High Paraná River. To our knowledge this constitutes the second and northernmost record of the species for Argentina and the first for a subtropical environment in the country.

Key words: freshwater protozoon, symbiotic ciliate, new report

The genus *Ophrydium* Bory de St Vincent, 1824 comprises about sixteen species of sessile peritrichous ciliates that can be found as solitary organisms or colonies in freshwater environments of Africa, America and Eurasia (Winkler and Corliss 1965; Foissner 2007; Oberholster et al. 2010; Reichholf 2012). Two species are known to occur in Argentina, *Ophrydium naumanni* Pejler, 1962 and *Ophrydium versatile* (Müller, 1786) Ehrenberg, 1838. The former has been reported to be a dominant species in transparent oligotrophic Andean lakes from Argentina and Chile (Modenutti 1997; Queimaliños et al. 1999; Modenutti and Balseiro 2002), whereas *O. versatile* was found in Buenos Aires province by Seckt (1924), who included it in a species list without providing a definite locality and a species description. *Ophrydium versatile* is widely distributed in temperate lakes in Europe and America; however, its occurrence in a river system was recorded in 2010 for an African river where it was found attached to the bedrock in shallow, slow-flowing water (Oberholster et al. 2010). This study reports for the first time the occurrence of *O. versatile* in the Misiones province, Argentina within the High Paraná River influence area.

Gelatinous colonial masses were manually collected during fieldwork on 26 April 2013, in a recently formed pond of the Garupá stream floodplain (27°28′7.16″ S, 055°48′16.89″ W; Misiones province, Argentina) at about 900 m away the confluence with the High Paraná River (Figure 1), a zone recognized as a subreservoir or lateral arm of the Yacyretá Reservoir (Argentina–Paraguay) (Meichtry de Zaburlín et al. 2010). Dissolved oxygen, temperature, pH and electrical conductivity were measured *in situ* by means of a Hanna HI9812-5/HI9145 analyzer. Colonial masses were captured alive for study in the laboratory. Colonies features were examined under a Leica Z45V stereoscopic microscope, and sections of live colonies and zooids were studied under a Leica DMLB light microscope at different magnifications.

Visible colonies were found in shallow waters (less than 0.5 m) attached either around submerged vegetation stems or directly to the bottom of the pond (Figures 2–7). Environmental parameters are shown in Table 1. Colonies and zooids were confirmed as *Ophrydium versatile* based on morphological features which were broadly consistent with the species data available in Winkler and Corliss 1965 and Oberholster et al. 2010. The size of colonies was variable, reaching up to 15 cm in diameter (Figure 5); only green colonies were recorded.

Small colonies were spherical, while the larger ones were more variable in shape ranging from flattened with a central cavity (donut appearance) to elongated masses (Figures 4–5). Most of the volume of the colonies was formed by gelatin with the zooids being evenly spaced on the surface of the gelatinous matrix (Figure 6).

Figure 1. Map of the Misiones province, northeastern Argentina. Black star indicates the locality where *Ophrydium versatile* was recorded.

Table 1. Environmental parameters taken at the sampling site compared to those recorded for an African river where *O. versatile* was reported.

Parameters	Subtropical system (This study)	Temperate system (Oberholster et al. 2010)
pH	6.7	7.44–8.38
Water temperature (ºC)	23	14.9–26.8
Electric conductivity (µS/cm)	57	50.1–70.5
Dissolved oxygen (mg/L)	6.20	5.20–6.49

Extended zooids ranged from 300 to 600 µm in length; the individuals' oral pole was oriented towards the surface and comprised two rows of spirally arranged cilia. Each zooid presented abundant endosymbiotic zoochlorellae (Figure 7). The combination of characters observed in *O. versatile* is not present in the other colonial form known in Argentina. The species is easily distinguished from *O. naumanni* which has smaller colonies with a lower number of zooids (Winkler and Corliss 1965). Although *O. versatile* could be confused with *O. sessile* Kent, 1882, the latter is distinguished by presenting a smaller size of the zooids and colonies (~3 mm) (Winkler and Corliss 1965; Kudo 1976). This new occurrence of *O. versatile* in Argentina was detected in a recently formed environment, as the result of an increase in water level of the High Paraná River after the final filling stage of the Yacyretá Reservoir in 2011 (Meichtry de Zaburlín et al. 2013). In this context, it is likely that new occurrences for the species will be reported in the region due to the colonization opportunities associated with these new formed environments. Even though the records for the species are often linked to temperate environments, this report is the first for a subtropical environment in northeastern Argentina and also the first for the High Paraná River basin. This finding is in agreement with the species presence in subtropical environments of Brazil, like those of the São Paulo state (Regali-Seleghim et al. 2011).

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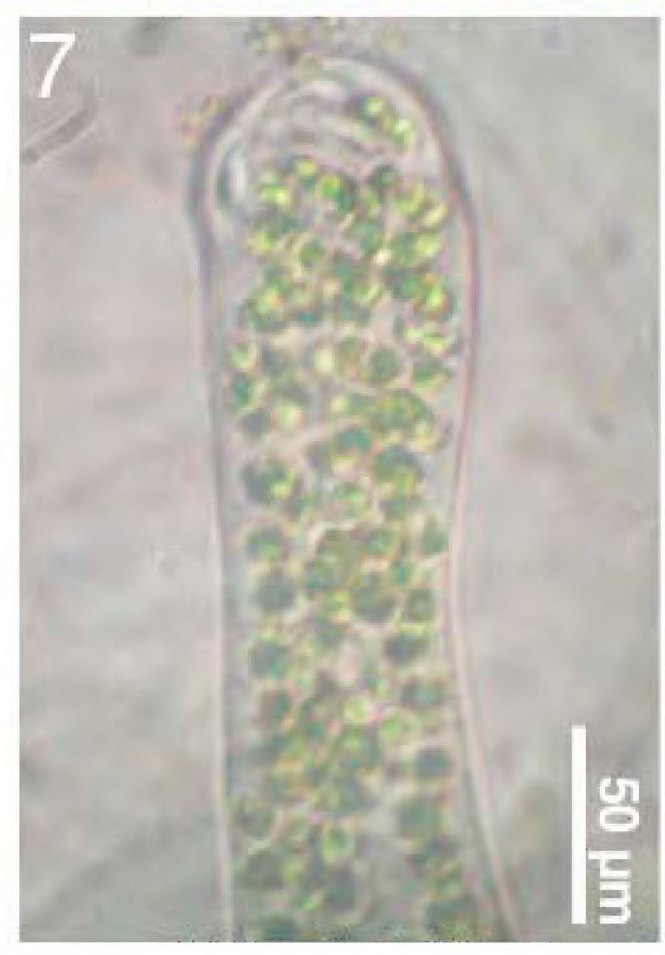

Figures 2–7. Habitat, colonies and individuals of *Ophrydium versatile* from Misiones province. **2:** Garupá stream floodplain. **3:** recently formed pond (sampling site). **4:** view of colonies *in situ*. **5:** large colony of approximately 15 cm in diameter attached to a stem. **6:** detail of zooids in a section of living colony (magnification 100 ×). **7:** Partial view of an isolated zooid with green symbiotic zoochlorellae in the cytoplasm (magnification 400 ×).

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